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FEBRUARY 1947

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FOR THE EXPERIMENTER & RADIO ENTHUSIAST

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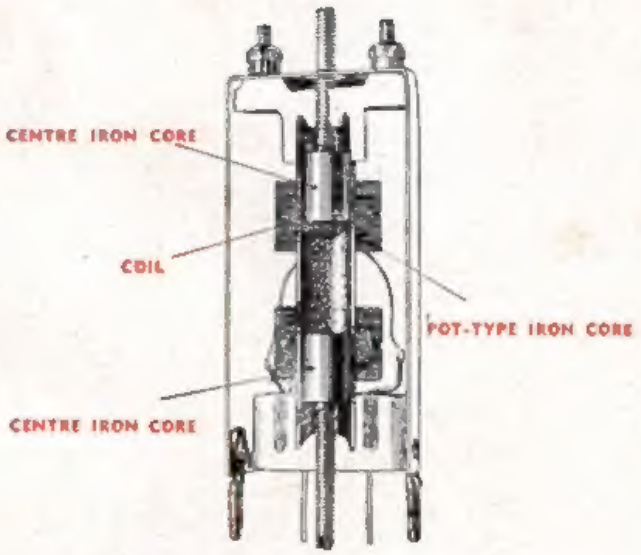

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Editorial

How many of us keep up to date with modern radio technique? How will these techniques affect Amateur Radio? Here are two questions which warrant a little "pondering upon."

Some of us who had no opportunity of participating in the rapid development of electronics during the last five or six years are perhaps a little bewildered by wave guides and cavity resonators. It may be many moons before these devices find a place on the back lawn or in the junk box of the "average ham"—but at least he might like to know what they look like now.

The Wireless Institute has among its members, amateurs who are well equipped to "tell us about it," either by lectures or articles in this Journal.

A progressive technical education policy within the Institute will ensure that members are able to make adequate use of those "new" frequencies and methods of transmission and reception, the allocation of which for Amateur purposes your Federal Executive is keeping an eye on.

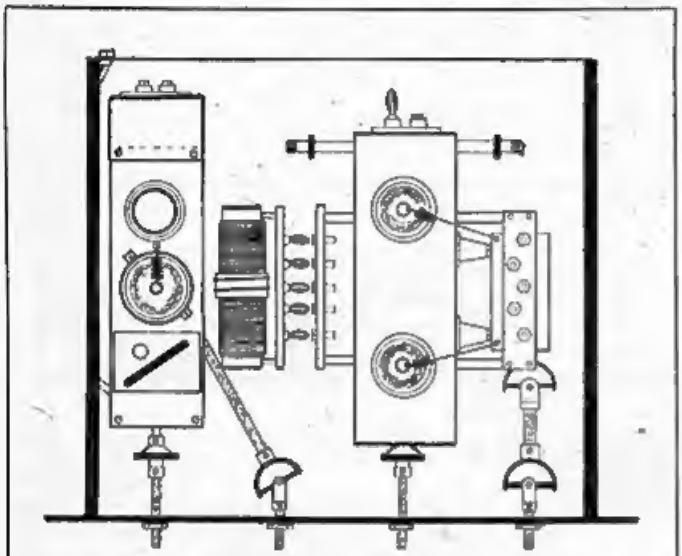
E. D. T.

IN THIS ISSUE

CLEARING THE ETHER.—Series II, Part VIII

By G. GLOVER, VK3AG*

Construction and Operation of Modern Transmitter—(Continued)



PLAN VIEW OF TWO STAGE R.F. AMPLIFIER — FIGURE-12

Practical Construction of 2 Stage R.F. Amplifier Unit: In the preceding sub-sections the author has covered most of the theoretical aspects of R.F. Amplifier design. The practical unit about to be discussed represents one method of attacking the problem, and the reasons for adopting various mechanical and electrical set-ups will be explained in the text.

General Construction.—Figure 12 portrays completed unit and the study of same will reveal that the two stages, which we will refer to as first and second stages respectively, sit side by side on tray in standard, 6 unit, relay rack panel assembly. Each stage is arranged so that it may be patched in or out of circuit to facilitate experimentation.

Electrical Circuit of First Stage.—As depicted in Figure 13 the electrical circuit of the first stage is comparatively simple. The input circuit is link coupled to the exciter unit. A type 807 tube is employed and the output circuit is link coupled to the second stage. In order to eliminate self-oscillation near the operating frequency, a balanced tank is employed, stray capacity serving as neutralising element. The 2000 ohm resistor incorporated in the screen grid circuit merely serves as decoupling agent, the circuit is carried to the control panel so that if desired keying can be accomplished by applying negative voltage to this electrode. The metering leads, which also go away to the control panel, could be arranged so that grid current did not flow through cathode shunt; however as the grid current is so small in comparison with total cathode current this is not considered necessary. If desired individual meters can be placed on panel instead of employing central meter; however here we are concerned with maintaining maximum economy. Admittedly there are times when the simultaneous observation of both grid and anode currents facilitates detection of spurious oscillations; but usually these conditions only arise during initial tests of new equipment; hence, temporary connection of external instrument suffices.

Electrical Aspects of Coil Units for First Stage.—Both the input and output units for lower frequencies are equipped with parallel fixed or variable capacitors to permit main tuning capacitor to cover the desired frequency band, and at the same time provide required minimum capacity. For economy sake the fixed capacitor may comprise a number of small standard silvered-mica receiver type units arranged in series to withstand applied power. The writer uses the term "power" advisedly; because it is necessary to cope with both R.F. voltage developed across the tank circuit, and the heat generated by the circulatory current (refer to part 2 of this series).

In the case of output units, the coils are not enclosed in cans and in the case of lower frequency units, shunt capacitors may be dropped out of circuit for frequency doubling, thus reducing number of units required to cover desired range.

Mechanical Aspects of First Stage.—All components are mounted on 16 gauge steel plate (cadmium plated) measuring 3-in. by 9½-in., which in turn is mounted on four 3/8-in. by 3½-in. brass pillars. As can been seen from Figure 12, the input tuning unit socket is arranged at front end of unit with its tuning capacitor mounted immediately underneath.

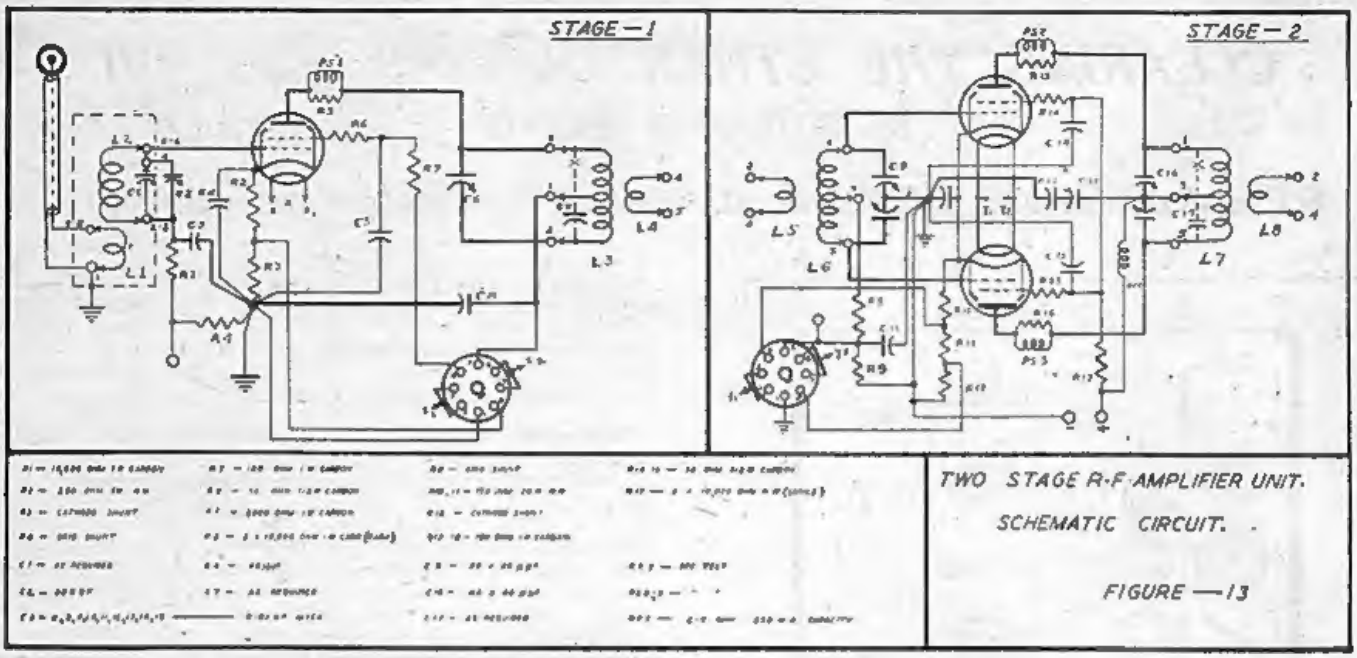
The tube socket is mounted in the centre with associated by-pass condensers and suppressor resistor mounted immediately on socket legs, while resistors are mounted on bakelite strip placed astride the underside of the socket. Anode coil socket is at rear end of unit with its tuning capacitor and by-pass condenser mounted directly underneath. The anode lead is taken through the metal plate via polystyrene insulator to pigtail which terminates in suppressor unit mounted on anode clip. The anode circuit is kept as far from grid and cathode circuit components as possible, in addition a tubular shield is provided around tube to suppress spurious oscillation.

The main advantage claimed for this set-up is the ease with which it can be wired or serviced, and the shortness of all electrical connections. To connect the grid tuning capacitor through front panel to dial, only a flexible insulated coupling is required. The anode capacitor however is a horse of a different color; here we have sacrificed mechanical simplicity for electrical efficiency; therefore, in order to maintain symmetry of our front panel we must employ two "knuckle" or "universal" couplings, and insulated interconnecting shaft to transmit dial motion to the capacitor. Not a very heavy price to pay for high electrical efficiency.

R.F. input socket is screwed to left side of main chassis assembly and connected to input tuning socket by short length of 75 ohm co-axial cable. R.F. output and power sockets are arranged on apron at the rear of unit.

Mechanical Aspects of Coil Units for First Stage.—Input units: coils and capacitors are mounted in similar manner to that employed in B.F.G.; but are arranged in

*Glorad Engineering Services.



TWO STAGE R-F AMPLIFIER UNIT.
SCHEMATIC CIRCUIT.

FIGURE — 13

larger type of shielding can, that is, 2-in. x 3-in. x 4½-in. high. Link is wound over cold end of grid coil.

Output units: Comprise 1½-in. diameter paper-based bakelite tubing 3½-in. long, slipped over 5 pin Mycanol 807 base for lower frequencies. A polystyrene or ceramic former may be used for higher frequencies. In this unit the link is wound over centre of each coil, and additional capacitors are mounted on coil according to requirements.

Operation of First Stage.—In operation this stage may be used to:—

(a) Drive second stage.

(b) Excite antenna, that is, it may be used as final stage, thus enabling the constructor to limit construction to this stage until finance and time permits addition of second stage.

(c) Drive another stage arranged on separate unit as alternative set-up.

(d) Amplify either the fundamental frequency or harmonic thereof. Good output is obtainable on fundamental, second, and third harmonics.

Bugs, Bugs, Bugs—This can, without fear of contradiction, be called the most important indication of success or failure of any design. The following bugs appeared during initial tests and were eliminated by the means indicated.

(a) Self Oscillation Near Operating Frequency.—Cured by adding tubular shielding around tube and employing balanced anode tank depicted in Figure 13.

(b) Spurious Oscillation in Screen Grid/Anode Circuit.—Eliminated when 50 ohm stopper resistor was inserted between screen grid of tube and associated by-pass condenser, plus addition of tube shield.

Electrical Circuit of Second Stage is illustrated in Figure 13. The electrical circuit of this stage is also comparatively simple. The input circuit being link coupled to the first stage. Two type 807s are used in push-pull circuit for straight amplification and in push-push for doubling. The output circuit is link coupled to the antenna tuner, or may likewise be coupled to further stage for frequency multiplication, etc.

As this stage is designed with a view to anode modulation (amplitude) the screen grid is connected to anode supply via dropping resistor. Cathode biassing resistor comprises two 150 ohm units in series. One unit being short circuited for C.W. operation at full power. Metering leads, see remarks under first stage.

Electrical Aspects of Tuning Units of Second Stage.—As in the case of first stage, lower frequency input and output units are equipped with parallel fixed capacitors to provide required minimum capacity or "Q" Factor.

Mechanical Aspects of Second Stage.—All components in this case are mounted in 16 gauge steel cadmium plated box of unusual construction. The sides of box measuring 10-in. x 5½-in. Plate similar to that employed for first stage is mounted at point two inches below the top edge, and serves to mount tube sockets, associated stopper resistors, by-pass condensers and dropping resistors. The grid tuning capacitor is mounted underneath the centre of plate and attached to dial via insulated flexible coupling. False cover shown provides necessary shielding for tubes, cathode and screen resistors, and serves as mounting for power sockets.

Gril coil mount projects from the left side of unit, and it consists of a bar of polystyrene having five jacks to receive coil unit. It is mounted on brass spacers by the use of long metal thread screws and nuts. In Figure 12 coil is shown with plugs just entering jacks with a view to conveying picture of type of plug employed. Grid resistor mounts directly between the centre jack and by-pass condenser.

Anode coil mount is supported by brackets from the right side of unit. The bar takes the same form as that for grid coil, and in this instance coil has been removed to show layout of jacks.

Anode tuning capacitor is mounted on stand-off insulators immediately below coil jack bar, and with it is associated anode by-pass condenser and R.F. choke; thus providing adequate isolation between grid and anode circuits. In order to reduce length of anode tank leads to a minimum, capacitor has been mounted without regard for alignment of dial shaft, hence two universal couplings and insulated inter-connecting shaft are required; however, the shorter leads enable unit to be operated efficiently at higher frequency so that the additional expense is well merited.

Continued on Page 21

THE FOLDED DIPOLE

By GEORGE H. CHOULES, VK3AIIB*

Much discussion has taken place in Amateur circles re this novel form of impedance matching antenna. As the writer had ideas of building a rotary beam antenna for 28 Mc., notes were taken of these discussions, and all available text books were scanned for the "real dope." After collating the various ideas, rumours and miscellaneous scraps of information, the nett result appeared to be almost nil, as quite a lot of the "evidence" appeared to be conflicting.

A further period of intensive "bookworming" ensued and at last a ray of light appeared in the form of the following statement by one of R.C.A's. foremost antenna experts.

Extract from an article by P. S. Carter, R.C.A. Review, October, 1939:—

"This type of antenna consists of two closely spaced half-wave dipoles connected together at their ends. One of the dipoles is broken at its center and fed from a balanced transmission line. The instantaneous currents in both units are in the same direction in space while both are flowing toward a nodal point at one extremity of the radiating structure. The current distribution does not differ greatly from that of an ordinary half-wave dipole and is approximately sinusoidal.

"Since the two radiators are very closely spaced in terms of wavelength the radiation pattern is essentially the same as the pattern of an ordinary half-wave dipole. The total power radiated per total loop circuit squared, or radiation resistance, is therefore about 73 ohms. However if the diameters of the two radiators are equal, this same radiated power is equivalent to a radiation resistance with respect to the current in one branch, of four times 73 ohms or 292 ohms. The latter value of resistance is that which is seen by the transmission line at its terminals. This type of antenna thus serves the double purpose of a radiator and impedance matching transformer.

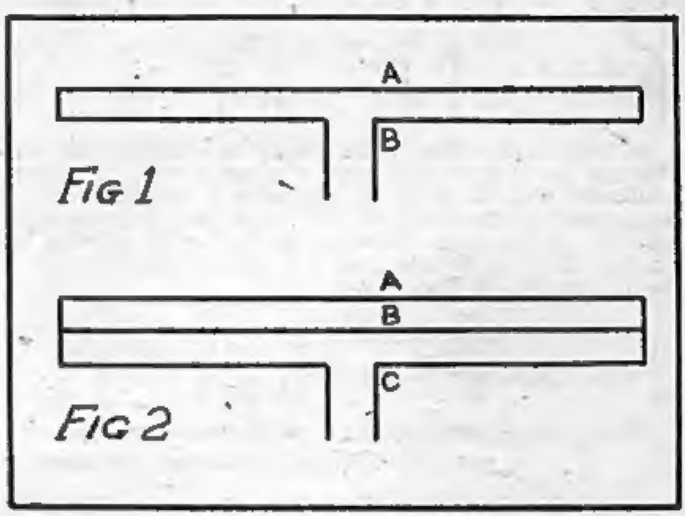
"When three radiators of equal diameters are arranged in accordance with this method, a transformation ratio of nine is obtained. Any desired ratio of transformation may be obtained by the use of two or more radiators of unequal diameters. In such an arrangement of two units wherein the smaller diameter conductor is fed from the transmission line, the transformation ratio is greater than four, since the greater of the two currents flows along the larger conductor."

Unfortunately, Mr. Carter did not elaborate on his theme of unequal diameters and no formulae were given. After several perusals of the above statement, and the burning of much midnight oil, the writer managed to derive a formula relating the diameter ratio of the conductors to the impedance "step-up" to be obtained with respect to an ordinary half-wave dipole.

Here it is, together with the reasoning which led to its derivation.

Consider an ordinary half-wave dipole in free space, and assume a certain power input to the feeder which will cause a current of one ampere to flow at the centre of the dipole. If the feeder is completely "flat" or non-reactive, the radiated power will be proportional to the square of this centre current multiplied by the radiation resistance at the centre of the dipole, which, for the purpose of this discussion, we will assume to be 73 ohms.

Thus, $W = I^2R = I^2 \times 73 = 73$ Watts
and $R = W/I^2 = 73/1^2 = 73$ Ohms
Equals Centre Impedance of Dipole, Zl.



Assuming the surge impedance of the feeder to be 73 Ohms we have a perfect impedance match.

e.g. centre impedance of dipole = Zl = 73 Ohms.
surge impedance of feeder = Zo = 73 Ohms.
Impedance ratio Zl/Zo = 73/73 = 1/1.

If we now "fold" the dipole, as in Figure 1, and make the diameter of each conductor identical it will be seen that the conditions have now changed considerably. Assuming the same power input to the antenna as before, the centre current I = 1 ampere, will now divide in proportion to the conductivity or **sectional area** of each conductor.

Since the diameters are equal, the areas will be equal and half the total current, 0.5 ampere will flow in each conductor.

Also, since the two conductors are spaced only a small fraction of a wavelength, the centre impedance of the antenna as a whole is still 73 ohms. (Carter, par. 3.)

But the feeder is attached to only one conductor so that the impedance looking into the centre of this conductor will be proportional to its current squared, with respect to the total antenna impedance of 73 ohms.

Since the total radiated power is the same as before, e.g. 73 watts, but the current in one conductor (the driven one) is now only 0.5 ampere.

$Zl = W/I^2 = 73/.5^2 = 73/.25 = 292$ Ohms.
and the impedance ratio Zl/Zo = 292/73 = 4/1.

Similarly with three conductors each of the same diameter, as in Figure 2. The total current I = 1 ampere, now divides equally in three directions.

A = 0.333 Ampere
B = 0.333 Ampere
C = 0.333 Ampere

and the impedance looking into the centre of C will be
$Zl = W/I^2 = 73/.333^2 = 73/.111 = 657$ Ohms
and the impedance ratio Zl/Zo = 657/73 = 9/1.

It can also be shown that in the case of a four conductor dipole, the impedance ratio is 16/1.

It can now be seen that in the case of Figure 1, the

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impedance ratio is proportional to the **sectional areas** of A and B. Thus—

$$\left[\left(\frac{A}{B}\right)+1\right]^2=\left[\left(\frac{1}{1}\right)+1\right]^2=(1+1)^2=4$$

and in the case of Figure 2—

$$\left[\left(\frac{A+B}{C}\right)+1\right]^2=\left[\left(\frac{1}{1+1}\right)+1\right]^2=(2+1)^2=9$$

If now, in the case of Figure 2, we combine the conductors A and B into one conductor with the same **sectional area** of A + B, we have a conductor D, of equivalent conductivity to that of A and B in parallel, and 2/3 of the total current will flow in it, leaving 1/3 to flow in C as before, and the centre impedance of C is the same as in Figure 2.

So that we can now write,

$$\text{Impedance ratio } Z1/Zo=\left[\left(\frac{D}{C}\right)+1\right]^2$$

Where D = Sectional area of the folded conductor.
C = Sectional area of the driven conductor.

Since the area ratio is the square of the diameter ratio, this becomes,

$$Z1/Zo=\left[\left(\frac{D}{C}\right)^2+1\right]^2$$

Where D = diameter of the folded conductor.
C = diameter of the driven conductor.

This relationship holds whether the conductors are of solid or tubular section, provided that the wall thicknesses of the tubular conductors are similar, as Radio Frequency currents travel mostly on the surface.

For ease of working out practical examples we can now transpose the above formula and write,

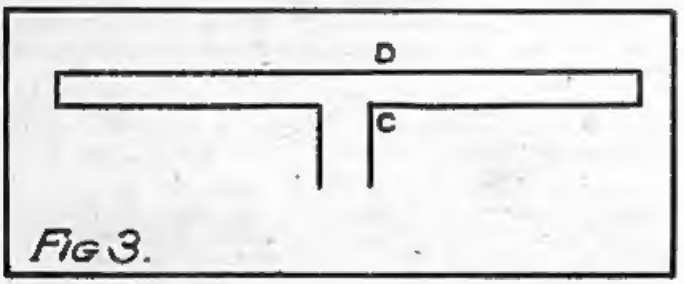

Fig 3.

$$\text{Area ratio } D/C=\left(\sqrt[2]{\frac{Zo}{Z1}}\right)-1$$

Where Zo = surge impedance of cable
Z1 = beam input impedance

and diameter ratio = $\sqrt[2]{\text{area ratio}}$.

We can now proceed to work out some practical examples as applied to the matching of beam antennae to a co-axial feeder.

Take, for instance, a three element beam with conventional spacing of .1 wavelength for the director and .15 wavelength for the reflector.

The A.R.R.L. Antenna Handbook states the beam input impedance to be between 8 and 10 ohms. For ease of calculation we will assume it to be 9 ohms and the surge impedance of the feeder to be 72 ohms. The impedance ratio is seen to be 72/9 = 8/1.

We have some ¾-inch diameter tubing for the elements and wish to find the correct diameter of tubing to use for the driven element so that a correct match is obtained to a 72 ohm cable.

From the formula,

$$\text{area ratio } D/C=\left(\sqrt[2]{\frac{Zo}{Z1}}\right)-1=\left(\sqrt[2]{\frac{72}{9}}\right)-1$$

equals $(\sqrt[2]{8})-1=2.83-1=1.83$

diameter ratio $D/C=\sqrt{1.83}=1.35/1.$

The diameter of D = 0.75-inch

$$\text{therefore diameter of C}=\frac{0.75}{1.35}=0.555\text{-inch.}$$

The nearest stock size of tubing is 0.5625-inch, that is 9/16-inch diameter.

Similarly for a four element beam with an input impedance of say, 6 ohms, and using 3/8-inch diameter elements (the writer's case):—

$$\frac{Zo}{Z1}=\frac{72}{6}=12/1$$

$$\text{area ratio } D/C\left(\sqrt[2]{\frac{Zo}{Z1}}\right)-1=(\sqrt[2]{12})-1=2.47$$

diameter ratio $=\sqrt{2.47}=1.57/1.$

The diameter of D = .375-inch

$$\text{therefore diameter of driven conductor}=\frac{.375}{1.57}=0.240\text{-in.}$$

The nearest stock size of tubing is .25-inch, that is ¼-inch diameter.

If it is desired to find the impedance relations in an existing set-up we can use the formula,

$$Z1/Zo\left[\left(\frac{D}{C}\right)^2+1\right]^2$$

where D = diameter of folded conductor
C = diameter of driven conductor.

In a three element beam with conventional spacing, if say, the elements are of ¾-inch diameter tubing and the driven element is of ¼-inch diameter tubing, we have,

D = 0.75-inch diameter
C = 0.25-inch diameter
Z1 = 9 ohms
Zo = 72 ohms

$$\text{Impedance ratio } Z1/Zo\left[\left(\frac{.75}{.25}\right)^2+1\right]^2$$

equals $(3^2+1)^2=10^2=100/1.$

So that when the beam input impedance Z1 = 9 ohms is multiplied by this ratio it becomes 900 ohms, which is the impedance the 72 ohm cable is looking into. An impossible situation, as due to factors which will not be discussed here, the maximum practical impedance step-up to be obtained with a folded dipole is of the order of 20/1.

The writer is aware that some controversial points arise in the above discussion but he feels that it is at least, a practical approach to a problem on which little information is available. His four element beam, designed according to the foregoing formulae, is completely non-reactive at the operating frequency, draws power remarkably well and has worked an impressive list of G stations on 28 Mc. In view of this performance, the writer feels that the burning of the aforementioned midnight oil was not entirely wasted.

It is emphasised that the above relations do not hold if the beam is closer than ¾ to 1 wavelength to surrounding objects such as roofs, etc., as, under these conditions, the objects act as additional parasitic antennae of unknown characteristics and the entire set-up of self and mutual impedances is completely disorganised.

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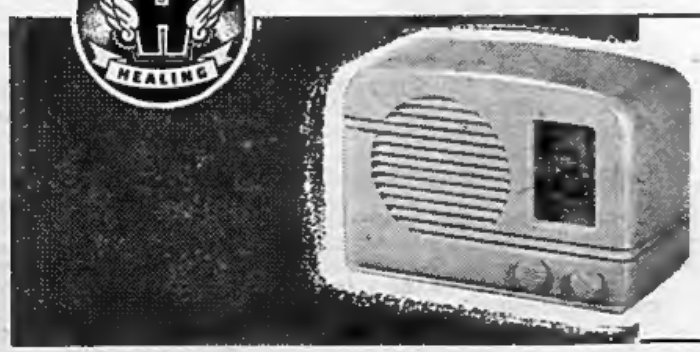

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PROPAGATION PREDICTIONS FOR FEBRUARY, 1947

We are happy to announce the re-commencement of these monthly predictions which were discontinued in September, 1946, owing to lack of space, but which apparently have been missed by quite a number of readers.

For the benefit of new readers it might be advisable at this juncture to explain how these predictions are made and how they can be applied to amateur work.

The information contained in these predictions is taken from a monthly publication known as the Radio Propagation Bulletin, issued by the Australian Radio Propagation Committee of the Radio Research Board of the Council for Scientific and Industrial Research. These Bulletins are compiled from information on ionospheric conditions received from observation stations in all parts of the world and from the Commonwealth Solar Observatory at Mount Stromlo. From a close observation of all the information received from these stations it is possible to issue forecasts with a high degree of accuracy as far ahead as six weeks from the date of publication.

The Bulletins contain a map of the world divided into various zones, and charts are published for the different latitudes of these zones which give (a) the maximum useable frequency and (b) the optimum working frequency for various skip distances from 0 to 2500 miles for the 24 hour period. The maximum useable frequency, M.U.F., is defined as the highest frequency which may be used with any degree of reliability for any given skip distance; whilst optimum working frequency, O.W.F., is the frequency which will ensure positive and reliable communication at the times stated on the chart. In general the optimum working frequency may be taken to be round about 75-80% of the maximum useable frequency. The propagation predictions are made for transmissions by way of the regular ionospheric layers and graphs are drawn for the F2 layer.

The recent phenomenal condtions on the 50-54 Mc. band were predicted by the Bulletins. Of course it must be realised that freakish conditions such as abnormal magnetic disturbances and local atmospheric conditions which are apt to spring up suddenly cannot be foreseen when the predictions are made.

It is obviously not possible for a complete reprint of these Bulletins to be made in "Amateur Radio," so we shall confine our abstracts to information relative to the amateur bands. It should be noted that where skip distances are given, these only hold good where the point of reflection is in the same zone as the transmitting station and in latitude five degrees either side.

The zone with which we are concerned is Zone E which roughly encompasses an area from longitude 30 degrees East to 180 degrees East, containing Australia, India, China, Asia and the North Western tip of Alaska. Other zones are as follows: Zone I, containing Africa, Europe, New Zealand, Alaska and North Western Canada. Zone W, North and South America and Eastern Canada.

The skip distances given are only for single hop working. Those interested in multi-hop paths are advised to obtain a copy of the Bulletin and to use the transparent sheet provided for the calculation of these paths.

Here then are the propagation predictions for February, 1947, as applied to the amateur bands.

Zone E.—Latitude 10° South (Northern Queensland, Northern Territory, North Western Australia):—

Maximum useable frequency 48 Mc., shows skip of 2,500 miles at 1400 hours local time at point of reflection. Optimum working frequency 38 Mc.

7 Mc.—Useless at all times for DX working.

14 Mc.—At midnight shows skip at 500 miles, increasing to about 1,200 miles at 0600 hours, then steadily decreasing until at 1400 hours it is no greater than 200 miles. After this time skip steadily increases to 500 miles at midnight.

28 Mc.—Shows excellent possibilities for DX. At midnight skip is about 1,800 miles, increasing to 2,500 miles at 0200 hours. After this time a fade out occurs until approximately 0800 hours when skip is once again 2,500 miles decreasing to 1,200 miles at 1400 hours and steadily increasing to 1,800 miles at midnight.

Zone E.—Latitude 20° South (Southern Queensland, New South Wales, South Australia, Southern West Australia):—

Maximum useable frequency is 40 Mc.

7 Mc.—Shows a peak of up to 500 miles' skip between 0300 hours and 0700 hours, apart from this not much doing.

14 Mc.—At midnight skip is about 800 miles, rising to about 1,400 miles at 0600 hours, then decreasing to 600 miles at 1600 hours, and steadily rising to 800 miles at midnight.

28 Mc.—Dead until 0800 hours, when skip is 2,500 miles decreasing to 1,500 miles at 1500 hours, and increasing to 2,500 miles at 1900 hours after which time another fade out occurs.

Zone E.—Latitude 30° South (Victoria, Southern N.S.W., Southern S.A., and Southern W.W.):—

Maximum useable frequency is 32 Mc.

7 Mc.—Useful for skip distances up to 500 miles from 0100 hours to 0700 hours.

14 Mc.—At midnight skip is about 1,200 miles increasing to about 1,800 miles at 0500 hours, then decreasing to 800 miles at 1000 hours. This condition remains fairly static until 1700 hours when skip steadily increases to 1,200 at midnight.

28 Mc.—According to the charts this band may not be very reliable as no graph is shown for 28 Mc. as the optimum working frequency. It may however prove useable for skip of about 1,800 miles from 0900 hours to 1700 hours.

Zone E.—Latitude 40° South (Tasmania):—

Maximum useable frequency is 32 Mc.

7 Mc.—OK for skip distances up to 500 miles from midnight to 0700 hours and again from 200 hours to midnight.

14 Mc.—Skip at midnight is 1,300 miles, increasing to 2,000 miles at 0500 hours, then decreasing to 1,000 miles at 0800 hours. This condition holds till 1600 hours when skip drops to 800 miles until 2100 hours then rises to 1300 hours at midnight.

28 Mc.—Not very hopeful. Might possibly be useable for skip of 2,500 miles from 0100 hours till 0200 hours.

The amateur who wishes to make a study of ionospheric conditions, and to apply this knowledge to his hobby to enable him to select the best operating frequency for the respective time of day and distance he wishes to communicate, is earnestly recommended to the study of these Bulletins. Bulletins are obtainable at 2/- per copy from all newsagents and booksellers. (Wholesale distributors Gordon and Gotch [Aust.] Limited.) A handbook for the interpretation of the Bulletins is also available. Our copy by courtesy of the Council for Scientific and Industrial Research.

FEDERAL NOTES

FEDERAL CONVENTION

The annual Federal Convention of the Wireless Institute of Australia is to be held in Melbourne at Easter, commencing on 4th April. If any member has any matter which he desires to submit to the convention he should immediately communicate with his Divisional Council. The Divisional Councils are preparing agenda items now.

W.A.S. CERTIFICATE

The Wireless Institute of Australia is to establish a Worked All States Certificate for 50 Mc. and above. Federal Executive is seeking a suitable design for this certificate and it has been decided to offer a prize for the best design submitted. Ideas and sketches should be forwarded to Federal Executive, Box 2611W Melbourne, before 31st March. The Federal Convention members will be the judges of the winning entry. Let us see what you would like as a W.A.S. Certificate on your wall.

DX CENTURY CLUB

An Australian DX Century Club is being inaugurated. The "Century" consists of post-war calls only. We shall have more information for you soon.

B.E.R.U. CONTESTS, 1947

The Radio Society of Great Britain has sent us some entry forms for the B.E.R.U. contests to be held in April. If you are taking part in these contests you can obtain an entry form which contains all the rules, from Federal Executive or the Divisional Secretaries. The following are some extracts of the rules:—

The event will be divided into three sections, namely:—

(a) Senior (high power) transmitting contest.
(b) Junior (low power) transmitting contest.
(c) Reception contest.

In Australia the contest is open only to financial members of the Wireless Institute of Australia. A trophy will be awarded to the fully paid up member of the R.S.G.B. scoring the highest number of points in each section of the contest. Certificates of merit will be awarded to the first three stations in each contest, and also to the leading station in each Prefix Zone, providing at least three entries have been received from the Zone in question

The judging will be carried out by the R.S.G.B. Contests Committee. The President's decision will be final in all cases of dispute.

The High Power Transmitting Contest will extend from 0001 G.M.T., Saturday, 12th April, to 2400 G.M.T., Tuesday, 15th April, 1947. A maximum of 30 hours operation may be selected from the total 96.

Any amateur frequency band may be used provided the input to the final amplifier is not in excess of that specified on the competitor's licence and in no case more than 150 watts.

The Low Power Transmitting Contest will extend from 0001 G.M.T., Thursday, 17th April, to 2400 G.M.T., Sunday, 20th April, 1947

The Reception Contest extends from 0001 G.M.T., 12th April to 2400 G.M.T., 20th April, excluding Wednesday, 16th April.

To claim points the following information must be logged.—

(a) Call of station heard.
(b) Call of station being worked.
(c) Entrant's report on the signals of the station heard—readability, strength, tone.
(d) The serial number given by the station heard to the station being worked.

The same station may only be logged once on each band during each section of the contest.

Please obtain your entry form early so that more forms can be secured from the R.S.G.B. in time for the contest.

NEW ULTRA COMPACT HIGH-Q AIR CAPACITOR

Of unusually high-Q and extraordinary mechanical and electrical stability, the new air-dielectric capacitor released by Philips Electrica Industries is assured of a ready market.

Developed and produced at the famous Philips works in Holland, it is now available to Australian set makers, servicemen, and experimenters. Small in size—less than one-half inch in diameter and 1-7/16 inches in ength—it is useful to beyond 500 megacycles. This capacitor provides 3 to 30 mmfd. with air and high quality ceramic insulation. Special features are the construction of rotor and stator in one piece, low inductance, multiple aluminium cups. Rotor meshing with stator gives a linear capacitance range of 27 mmfd. over three full rotations. Adjustment is permanent by virtue of a retention spring. It will be found that vibration does not affect capacitance since a long rotor bearing sleeve closely hugs a matching central ceramic insulator.

These capacitors have two solder terminals. They are so light that they may be mounted directly by connecting leads, although each can be supplied with a low-loss phenolic mounting plate.

The mechanical construction is such that adjustment of this trimmer is immeasurably more simple than with other currently available types. Persistance of the original setting, despite severe vibration, is another feature of this capacitor.

Philips advise that ample stocks of these trimmers are now to hand

VICTORIA

DX since the last notes were published was as follows Monday, 30th December, at 6 p.m the writer (3NW) contacted VK4HR Conditions were not very good and signals lasted only 15 minutes. Sunday, 5th January, VK4s came in well in the morning about 11 a.m. for some time and several contacts were made. Again at 6 p.m. two or three stations were heard Sunday, 12th, VK3MJ heard 2AZ and 2WJ working duplex, no contacts so far as is known. Monday, 20th, at about 8 p.m. VK7CW was heard at R9 plus working 2NO and later 2LZ. At the same time 7NC. was heard calling CQ on CW at R8/9 Although a number of Melbourne stations, including 3MJ, 3HK, 3YJ and the writer (3NW) called both these stations no contacts were made. Apparently the two VK7s were too busy with the VK2s. Signals disappeared about 15 minutes later

An interesting report comes from VK5QR during the month. He reported hearing 3ABA at about R4 on 26th December and later on 9th January he heard 3IZ and 3DA both at R9 or more Apparently there was an opening for VK5s at both those times but nobody here was listening Which all goes to show that we will have to be more systematic in our watching and keep those beams turning'

We regret having to report that Dave (3MJ) has had to retire temporarily from the radio field owing to pressure of work. Everyone will miss the ether-splitting 3MJ signal and the band will not be the same without this very active station. We hope the busy time will pass and that Dave will soon take his place again on the air and in the W.I.A. meetings. Another signal that will not be heard very often during the coming year is that of 3ZD Ron is to be busy with studies and is giving up the amateur game for the forthcoming twelve months. We wish him all the best and hope to hear him when work permits.

Several signals that were heard on the 50 Mc. band during last year and which disappeared after a few contacts, have been on lately 3DA, 3TQ and 3XM are becoming more active and 3TD and 3RO are some of the latest to put in an appearance Welcome to all these fellows.

3NW is still having very good cross-band duplex contacts with 3YS on 166 Mc. and 50 Mc 3YS now receives the 166 Mc. signal at R8/9 on his "rush box." The 50 Mc receiver at 3NW has been fitted with plug in coils and now covers both these bands. It appears to perform satisfactorily on 166 Mc. and it was interesting to check the stability of the HY615 linear osc. and 832 P.A. combination with it. Over a distance of three miles the signal was R9 plus without any antenna and the stability was such that it could not have been distinguished from crystal control using the 1600 Kc I.F. channel on the receiver. A corner reflector has been built and tried out under very adverse circumstances, during which no increase was noted at 3YS! However it is believed that lack of gain was due to the fact that the corner reflector was considerably lower than the co-axial dipole and had a number of stray wires across its "mouth."

A very good signal on 50 Mc. is that of Rex (3IZ) at Red Hill, who is experimenting with various beams and is active on the band almost every night. He is always R9 plus and uses a T55 in the final with 50 watts input. This is driven by the following exciter line up: 6V6GT osc. doubler (3.6 Mc. crystal), 6V6 dblr., 6L6 dblr., 807 dblr. Series modulation is used. Rex is doing good work on the receiving side with a super regen.

Very little is heard these days from Arch (3BW) whose signals used to be very reliable and a number of country stations who were planning to make an appearance on the band have not yet done so. Signals heard during the month include VK3s. MJ, KU, YS, ABA, XM, OT, MB, TQ, LR, NW, HK, DH, BW, IZ, DA, YJ, TD, PK and ZD.

QUEENSLAND

The past month has seen a continuance of DX conditions on 50 Mc. in VK4, the best effort of the month (to my knowledge) being VK4HR's contacts with VK5QR and VK5GF on the evening of Wednesday, 8th January. VK2s were also heard a-plenty on this occasion. VK5 signals were heard again on the night of Sunday, 12th January, as were VK2 and VK3 signals.

VK4HR, who has been in a position to keep a fairly constant watch on the band, reports that he has on many occasions heard DX stations flash through for a few seconds only to vanish just as quickly. The band opened up on Xmas morning apparently for the express purpose of letting 4FB wish 3MJ the Seasons Greetings, and then again cut loose on the 27th December when VK3s came through in great style. Two additional calls on the band are 4TR and 4KB, although the latter is not permanently installed as yet.

A recent visit to Bundaberg revealed considerable interest in 50 Mc. in that City; 4PG, 4BJ and 4UX being active. Skeds with Brisbane have so far been fruitless although 4PG has of course worked DX, 4PG's signal was heard in Brisbane on 5th January by 4HR.

The 166 Mc. band has been torn asunder by 4FB and 4XG, who thus share the distinction of having a whole band to themselves. They are calling for recruits however, as more population is needed.

SOUTH AUSTRALIA

Christmas Day was the first occasion that Interstate signals were heard on 50 Mc. in VK5. 5QR heard 2AZ and 2ML. After calling in vain for some time, 5QR contacted 2QQ on 7 Mc. who quickly passed on the information to 2NO, and the VK2 gang were thus on the alert for signals from VK5. The following day the band was again open. Here in Adelaide, 5KZ and 5QR were conducting portable tests with 5GF when weak signals from

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FEDERAL QSL BUREAU

The QSL Manager got a large-sized thrill recently when opening up a letter out tumbled a wad of fifty bank notes The thrill however was short-lived as closer scrutiny revealed that the notes were on the Central Bank of China and dated 1930, and were of the five dollar variety. Turning over the reverse side of the note showed that an enterprising bunch of W Hams running W0MCF/C1 had come by a large quatity of the valueless currency and overprinted the notes for use as QSL cards Quite a novel idea and worthy of the Naval Hams that thought it up.

Another surprise was a card turning up from W8LHH confirming a QSO with the writer in 1938!!! W8LHH apologies for being late with the card.

Circulars have been received from a body styling itself American QSL Bureau, Box 7073, Roseville Station, Newark 7, N.J., U.S.A., offering QSL facilities in the U.S.A. This body did not offer anything that is not already existing with the A.R.R.L. QSL Service so the offer was ignored. A letter to hand from the Assistant Secretary of the A.R.R.L. exhorts QSL Managers to disregard any circulars from the new body.

Another one for the stamp collectors—PY1AJ, Joao E Do Lago, Rua Sao Clemente 103-C, XXV,-Rio De Janeiro, Brazil.

Bud Barnard, W1NSS, 3rd, 126 High Street, Bristol, Conn., U.S.A., desires me to publish his thanks to all stations who contacted him while he operated W1NSS/K6 and to state that he will QSL all contacts on his return to Hawaii. Unfortunately Bud left all his cards packed up at Hawaii and so can do nil until his return. Bud's heart's desire is to visit VK one day. Here's hoping too, Bud.

The S.O.S. put over the W.I.A. session on 7 Mc. for VK3 Hams to call or write for their cards and thus clear the Bureau congestion caused through the heavy QSL traffic of November and December and the abandonment of the monthly meeting of the VK3 Division, bore fruit, but the congestion is still heavy and any Ham expecting cards would help a lot by collecting them either personally or by mail.

From VK3YL comes some interesting dope on YP1AA whom she contacted. YP1AA is on a ship in the Black Sea, and HZ1AB is on the edge of the Persian Gulf. The latter station runs six operators and is using a Collins transmitter with 10 frequencies that can be dialled, and 400 watts to a pair of 813s. Antenna used is a vertical 80 foot high. Thanks Austine

The correct QSL address for Porto Rico is:—K4KD, Box 1061, San Juan, Porto Rico. This information comes from KP4CC, Juan Castanera, who requests me tell the boys that anyone who has not received a card from him, to please write him and ask for it as he has his logs back to 1939

PK6HA, Lt. A. Hagers, N.E.I. Air Force, Biak, Neth. East Indies, writes with a bitter pen regarding the QSL propensities of VK stations in general. To the time of writing, 28/12/46, PK6HA worked and QSLd 142 VK stations. Up to that time he had received 27 cards in return. He encloses a list of the VK stations who have not QSLd but in the interests of space it is easier to list the stalons who have. They are VK2: ADE, ACX, AKX, DI, DA, PV, AM, AHR, DG, OI, VN; VK3: CN, CZ, DK, JA, MC, NM, OP, UM, UP, XK; VK4: DO, OS, RF; VK5JM; VK6: AS, RF. Now what about it all you chaps who have QSOd PK6HA and whose callsigns are not in the above list. As Lt. Hagers is a subscriber to "Amateur Radio" I would like him to let me know if this

par produces results, otherwise the list of non-QSLlers will have to be published.

A pleasurable letter was received this week from a VK3 station who had heard that the writer was relinquishing the post of VK3 QSL Manager. Although one derives satisfaction from seeing an idea take root and grow during the years and the knowledge that a show is running efficiently, it certainly is nice to hear it from someone else. Thanks a lot Geoff.

It is unlikely that the appointment of a successor to VK3RJ as VK3 QSL Manager will be finalised in time to appear in this issue of "Amateur Radio." Details of the change will, however, appear in the next issue. Until the change is notified the address of the VK3 Bureau remains at 23 Landale Street, Box Hill, E.11, Vic. In any case VK3RJ will continue as Federal QSL Manager.

The newly appointed Membership Secretary for VK3 is George Manning (VK3XJ) and all enquiries re membership in the VK3 Division should be addressed to George.

The VK3 QSL Manager will be on leave from 27th January to 11th February and this time intends visiting the Blackwood district on the trail of the yellow metal. QSL correspondence during this period will suffer some delay.

PRIZE FOR W.A.S. CERTIFICATE

The amateur whose design for a W.A.S. 50 Mc. and above certificate is accepted, will receive a prize to be announced later. Closing date is 31st March in Melbourne. Address your entries to: The Federal Executive, Box 2611W Melbourne. The judging will be done by the Federal Convention in early April.

Let us see what the artistic ham can produce!

INTERNATIONAL AMATEUR FREQUENCY ALLOCATIONS

AUSTRALIA

3500-3800 Kc.
7000-7200 Kc.
14000-14400 Kc
28000-30000 Kc.
50-54 Mc.
166-170 Mc.
1345-1425 Mc
2500-2700 Mc.
5250-5650 Mc
10000-10500 Mc.

Type A0 emission may be used on all bands from 166 Mc. upwards.

AMERICA

3500-4000 Kc. A1.
3850-4000 Kc. A3.
7000-7300 Kc. A1.
14000-14400 Kc. A1.
14200-14300 Kc. A3.
27185-27445 Kc. A0, A1, A2, A3, A4, FM.
28000-29700 Kc. A1.
28500-29700 Kc. A3.
29000-29700 Kc. FM.
50-54 Mc. A1, A2, A3, A4.
52.5-54 Mc. FM.
235-240 Mc. A0, A1, A2, A3, A4, FM.
420-430 Mc. A0, A1, A2, A3, A4, FM.
1215-1295 Mc. A0, A1, A2, A3, A4, A5, FM, Pulse
2300-2450 Mc. A0, A1, A2, A3, A4, A5, FM, Pulse
3300-3500 Mc. A0, A1, A2, A3, A4, A5, FM, Pulse
5650-5850 Mc. A0, A1, A2, A3, A4, A5, FM, Pulse
10000-10500 Mc. A0, A1, A2, A3, A4, A5, FM, Pulse
21000-22000 Mc. A0, A1, A2, A3, A4, A5, FM, Pulse
All above 30000 Mc. A0, A1, A2, A3, A4, A5, FM, Pulse.
Peak antenna power must not exceed 50 watts

A0—Unmodulated carrier; A1—CW; A2—MCW; A3—AM Telephony; A4—Facsimile; A5—Television; FM—Frequency Modulation.

NETHERLANDS

3500-3900 Kc. CW.
3600-4000 Kc. Telephony.
7000-7300 Kc. CW.
7150-7300 Kc. Telephony.
14000-14400 Kc. CW.
14100-14400 Kc. Telephony.
28000-30000 Kc. CW.
28200-28500 Kc. Telephony other than USA.
28500-29700 Kc. USA Telephony.
29000-29700 Kc. FM Telephony.
58.5-60 Mc. CW.
58.75-59 Mc. DX Telephony.
59-60 Mc. Local Telephony.

The V.E.R.O.N. proposes that these divisions of the bands be considered for adoption by member societies of the I.A.R.U. The V.E.R.O.N. are requesting their Government to change the 58.5-60 Mc. assignment to 50-54 Mc.

FRANCE

3500-3625 Kc. 50 watts.
7000-7200 Kc 50 watts.
14000-14400 Kc. 50 watts.
28000-30000 Kc 100 watts.
58500-60000 Kc 100 watts.

SWEDEN

3500-3635 Kc CW.
3685-3950 Kc. Phone and CW.
7000-7100 Kc CW.
7100-7300 Kc Phone and CW
14000-14100 Kc CW
14100-14250 Kc Phone and CW.
14250-14400 Kc. CW
28000-28200 Kc CW
28200-30000 Kc. Phone and CW
58 5-60 Mc
112-120 Mc.
235-240 Mc
420-430 Mc.

The maximum power for all bands is 50 watts.

NEW ZEALAND

3500-3960 Kc. CW and AM Phone.
7000-7300 Kc CW (H.F. Permit Holders)
14000-14400 Kc. CW (H.F. Permit Holders).
14200-14300 Kc. AM Phone (H.F. Permit Holders).
28000-30000 Kc. CW, AM Phone (H.F. Permit Holders).
50-54 Mc. CW, AM Phone (for general use).
52.5-54 Mc FM, PM Phone (for general use)
166-170 Mc. CW, AM, FM, PM Phone (H.F. Permit).
420-450 Mc. CW, AM, FM, PM Phone (H.F. Permit)
1345-1425 Mc. CW, AM, FM, PM Phone (H.F. Permit).

DIVISIONAL NOTES.

NEW SOUTH WALES

Secretary: Peter H. Adams, VK2JX, Box 1734 G.P.O. Sydney.

Meeting Place: Science House, Gloucester and Essex [redacted]

Meeting Night: Fourth Friday of each month.

The December meeting was well attended, over 100 members and visitors being present. The proposed arrangements for the Field Day, to be held at Wyong, 26th January, were discussed and it was decided to operate the hidden transmitter on 7 Mc., leaving the 166 Mc. gear until members had gained more experience on this band.

Don Knock, VK2NO, gave a resume of recent activity on the 50 Mc. band culminating in a number of two-way Interstate QSOs and in subsequent discussion it was revealed that ZL1KJ had heard VK2, 3, 4 and 5 signals It was proposed to ask Federal Executive to award a trophy for the first Interstate 50 Mc. QSO as decided at the last Federal Convention.

At the conclusion of general business a number of excellent sound films dealing with radar were shown. These were special instructional films used in the R.A.A.F. during the war and members gained a clear picture of the manner in which all types of radar equipment actually functioned.

Morrie Meyers (2VN), who went overseas on a business trip for Qantas towards the end of November, has been stationed for the past six weeks in Los Angeles. He has had numerous contacts with the local boys, operating from K6EBG and W6FUF, and has kept a regular sked with 2DA on 14 Mc. every Wednesday morning at 0100 hours E.A.S.T. Morrie usually stays the night at W6EBG's place, so he goes on the air just before breakfast, but poor old Harry must lose a lot of sleep. Over the Christmas Holidays Morrie made a trip to Mexico, but, although he asked the boys to look for him from XE1AM, he must have found the scenery—or the senoritas—more interesting than Ham Radio

VICTORIA

Secretary: A. B. D. EVANS, VK3VQ, Box 2611 W G.P.O., Melbourne.

Meeting Night: First Wednesday of each Month.

Meeting Place: Radio School, Melbourne Technical College.

WESTERN ZONE

This is the first report of the news from this Zone since our convention when 3HG was elected notes correspondent. 3HG would appreciate a call on 7 or 3.5 Mc. occasionally to gather notes and doings of the gang, so please look out for him on Sundays or week days around midday.

Most of the Zone stations are at present engaged in experimenting with mobile equipment for use in bush fire emergency work; 3YN, 3TW, 3AMP and 3QC being very active in this work. Of the Ham activity, most stations seem to work on 7 Mc. phone, with the DX stations keeping an ear on 14 and 28 Mc.

Our DX C.C. station, 3KX, has already passed the century post-war and is now waiting for conditions to improve to raise his score still further. —...— Your scribe is also nearing the coveted century, but finding conditions against him at present. —...— 3MC and 3NC also doing well with the DX, the latter using only 6

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CONTESTS

The A.R.R.L. will be conducting a DX contest in February and March. Unfortunately full details are not available, but it is understood that the details of the contest will appear in the January issue of QST, which issue is not to hand at the time of going to press.

However a few details are to hand The first half of the contest will commence on February 15 at 0001 GMT and ends on 16th February at 2359 GMT (48 hours less 2 minutes). The second half commences 15th March and ends on 16th March Times are the same as for the first half These are the details for the CW section The telephony section commences with the first half on 22nd February and ends on 23rd February. The second half commences 22nd March and ends on 23rd March. Times for both periods are 0001 GMT until 2359 GMT.

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In April the B.E.R.U. will conduct a contest which will be divided into three sections:—

(a) Senior (high power) transmitting contest.
(b) Junior (low power) transmitting contest.
(c) Reception contest.

The senior section will commence at 0001 GMT, Saturday, 12th April, and continue until 2400 GMT, Tuesday, 15th April, 1947, but only 30 hours operation will be permitted from the total of 96 allowed. The selection of the periods totalling the 30 hours is left to the individual operator. Input power of that specified on the competitor's licence, and in no case more than 150 watts

The junior section will commence at 0001 GMT, Thursday, 17th April, and ends at 2400 GMT, Sunday, 20th April, 1947. The same conditions apply as for the senior section except that the input must not exceed 25 watts.

Entrants must be financial members of the Wireless Institute of Australia, and logs must be submitted to the sponsors of the contest on the special forms supplied by the B.E.R.U. These forms may be obtained from the Australian contest manager, Mr. R. Cunningham, VK3ML, Box 2611W, G.P.O., Melbourne.

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ENGLISH AMATEURS

Permission has been granted for British Amateurs to use a new amateur band between the frequency limits of 2300-2450 Mcs. Maximum power must not exceed 25 watts. Frequency modulation may be used on this new band. Pulse operation is not permitted.

DIVISIONAL NOTES

(Continued from Page 14)

watts. —...— 3JA should take out a dealers' licence, as he has been buying and selling a lot of gear lately —...— 3TA now on full power after using an Army 108 to keep in touch with the Zone members. —...— 3GN is very quiet lately. —...— 3JX is all set to go on 50 Mc. —...— An old timer now in this Zone is Mart Chaffer, ex-3XF, now 3MH. Still another old timer to be bitten again is 3SA, who will be on soon. —...— 3II, 3NK, 3ZU, 3EQ and 3AGB all have good phone on 7 Mc. —...— 3FA not on much due to lack of time, but was heard on 14 Mc. lately with a good signal. —...— 3DX is co-operating with a mobile rig for fire work. —...— 3XI was on for a while but has not been heard of late. —...— Let's have your news before the 12th of each month, gang.

VICTORIAN BUSH FIRE COMMUNICATIONS

An account of some experiments conducted and tests made in Bush Fire Regions 4 and 5 (Hamilton Area) by VK3TW and VK3YN

It was realised at the outset that approaching the bush fire radio control matter in a haphazard way would inevitably reflect on the future success or otherwise of what may well become one of the most advanced developments in bush fire control.

Firstly a system had to be evolved and procedure adopted whereby radio could be employed in the most effective manner and with the least possibility of creating a position of utter chaos. It was realised that time was the essence of the contract this season and therefore the following scheme was evolved and put into operation.

We must first realise that fires of the type experienced in the Western District can quite easily obtain a front of over three miles, and travel at a speed of up to ten miles per hour, which, in itself, makes mobility a primary consideration Each brigade will be fighting its own section of the fire as a unit and under its own Captain, who, in turn, would operate under the control of the central fire officer, located at the base transmitter together with his auxiliary fire fighting units. Each brigade will have at its disposal a small portable transmitter and receiver with a range sufficient to remain in contact with the forward control unit, in this case a mobile 20 watt transmitter, which in turn will be in communication with the base station. Every home and many cars have broadcast receivers and to take advantage of this set up it was resolved to enlist the aid of the local commercial station who would broadcast details of the fire and issue warnings to threatened areas at the request of the responsible fire officer, who has an intimate knowledge of the fire via the radio communication system.

One of the main technical problems was the maintaining of communication between the mobile forward unit and the base station over an area in excess of 2,500 square miles. It was thought that the low frequency end of the 3.5 Mc. band was as good as any available to amateurs, especially as the allocation of more suitable frequencies in the 2.5 Mc. region would take valuable time to procure and further it is a relatively simple matter to calculate the increase in field strength which would be obtained at lower frequencies from the measurements taken.

Preliminary calculations showed that, freqeuncies in the 3.5 Mc. region, a power of approximately 14 watts would be required to give satisfactory reception at the maximum distance of 60 miles, using a short vertical antenna for transmission A transmitter was therefore constructed capable of this power output and field strength measurements were taken along all main roads radiating from the location of the base station to the boundary of the bush fire region concerned.

The results were very encouraging, and it was found possible to maintain mobile contact at a distance of 30 miles on roads entirely surrounded by mountain ranges in the Grampians. Owing to the high noise level at the base station, it was found desirable to increase the field strength and as power was fixed the efficiency of the antenna at the mobile station was increased by centre loading. When this was done the range was extended to 55 miles through the poorest country in the area. Tests with ex army equipment in this type of country proved them to have no practical use and plans are well in hand for the modification of sets type FS6 and 108 to render them serviceable for brigade to mobile communication.

A great deal of development work is yet to be done, although sufficient has been accomplished, in collaboration with the regional fire officer (Mr. K. Eales), to provide a workable system for this summer and a nucleus for expansion in preparation for the 1948 season. A surprising feature of the tests was the close adherence of the practical results obtained to the calculated results obtained from wave propagation formulae

Since the writing of the above, the communications net in the Hamilton area have attended two serious fires and in both cases were at the scene of the fire before the brigades arrived and the results proved conclusively the value of radio communications under such circumstances. Hams concerned in this case were VK3MC, VK3HG, VK3TW and VK3YN.

In other areas there is considerable activity. VK3QC has installed a mobile op the brigade truck at Terang and operated another mobile from his own panel van. One fire has been attended which was caused by lightning, and in spite of serious QRN, 100% communication was obtained from the scene of the fire to the town.

VK3AMP has spent considerable time in building and converting ex-service gear for use in bush fire communications. Using a rebuilt 19 set with plate modulation from a class B 6N7 and a 12 foot whip antenna he did a tour starting from Colac through Cressy, Lismore, Camperdown and back to Colac and in no case did his signal strength fall below R7

VK3GN at Ararat has also been busy and had built a complete transmitter for VL3KJ. VK3TA at Horsham has three mobile units ready for any emergency, and VK3BI at Ballarat in conjunction with VK3IV are also ready with a 7 Mc. outfit and are converting a 109. VK3JA is acting as a sub-base for VK3QC, VK3EQ at Warrnambool has established a base station and VK3ZU is acting as mobile.

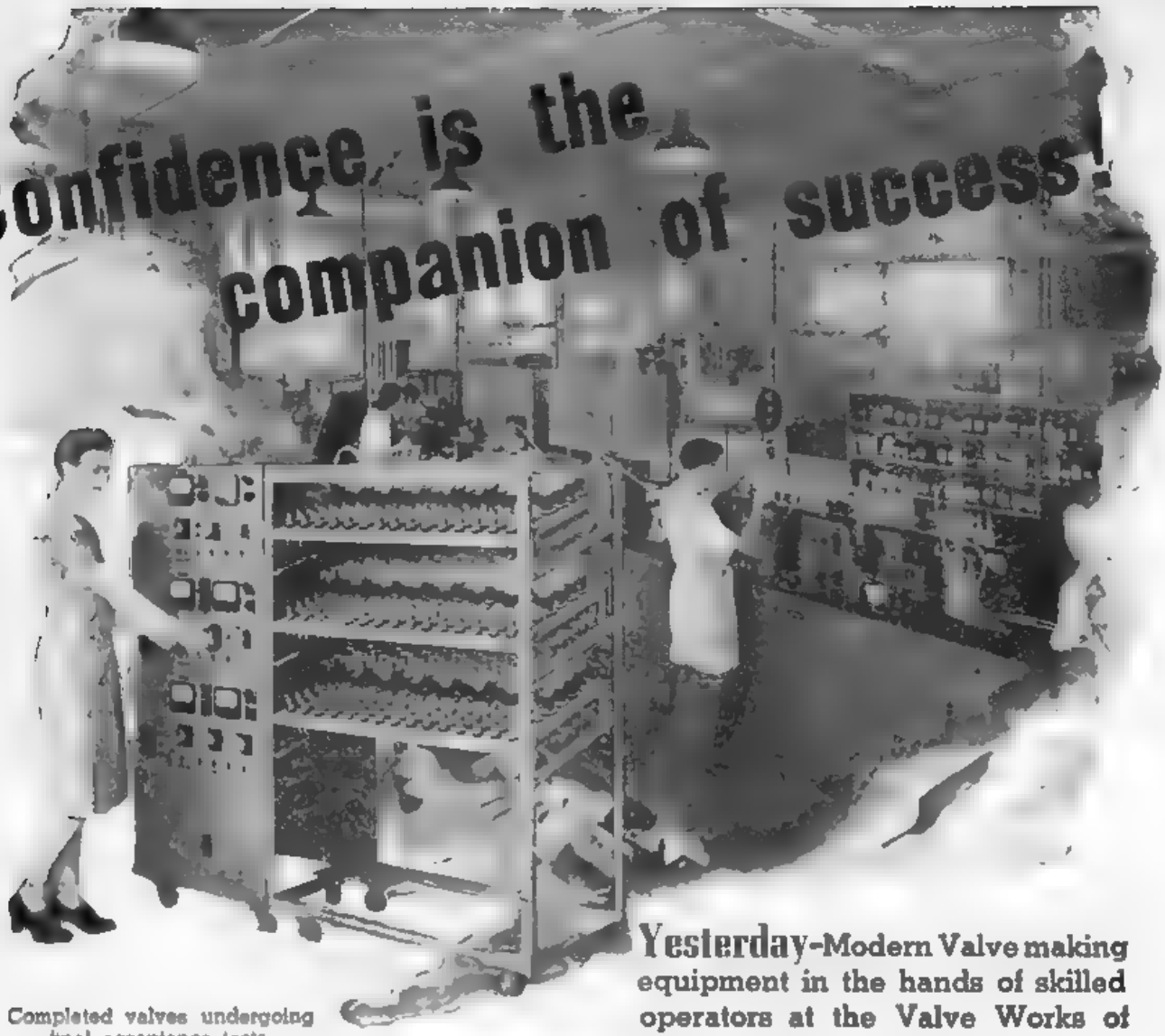
CONTENTS OF TEXT BOOK AND INSTRUMENT LIBRARIES

In our last bulletin we told you how to borrow books and instruments. In this issue we propose to give you some idea what you may borrow, and what instruments are available for use in laboratory under supervision.

Technical Book and Publication Library

Contains Magazines such as Amateur Radio, QST, Radio and Wireless World. Text Books: Admirality Handbook, Radiotron Designers' Handbook, A.R.R.L. Handbook, Fudamentals of Radio, by Ramsay; Frequency Modulation, by Hund; Hyper and U.H.F. Engineering, by Sarbacker and Edson; Radio Receiver Design, by Sturley; Radio Receiving Tubes, by Moyer and Wostrel; Radio Operating Questions and Answers, by Nilsen and Hornung; Automatic Frequency Control, by Rider, Basic Radio, by J. Barton Hoag, Time Bases, by O. S. Puckle; Fundamentals of Radio, by Terman; Radio Laboratory Handbook, by Scroggie. New books and magazines are being constantly added.

Confidence is the companion of success!



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The T.A.C. is constantly seeking advice of members as to what items they consider should be included in both Book and Instrument Libraries. Pass YOUR suggestion along at the first opportunity.

QUEENSLAND

Secretary: C. Marley, VK4CJ,
Box 638 J. G.P.O., Brisbane.

Meeting Place: State Service Building, Elizabeth St., City.

Meeting Night: First Friday of each month.

For all the information we have this month it is hardly worth while putting in an appearance at all. For the next month it should be possible to give some idea as to the date of our annual meeting and of course, with it, the election of office-bearers for the following year.

The 14 and 28 Mc. bands seem to have packed up in Brisbane, at least for the time being, although by sheer determination 4AP succeeded in grabbing off a couple of Africans on 28 Mc. and so got his post-war W.A.C. The grape vine passes along the information that 4CU has been holidaying at Redcliffe, and we trust enjoying himself.

Whilst in Bundaberg recently a visit was paid to the locals and incidentally the hospitality turned on was really appreciated. 4PG is mentioned in the V.H.F. Notes so omitting Arthur, we find 4BJ and 4UX very active on 14 and 7 Mc. and also very interested in 50 Mc. Both have new rigs in course of construction and they really look good, and it is to be hoped they work as well as they should.

So, until next month when we expect to have a little more to talk about, it's 73 es CUL.

SOUTH AUSTRALIA

Secretary: E. A. Barbier, VK5MD,
Box 1234 K, G.P.O., Adelaide.

Meeting Place: 17 Waymouth Street, Adelaide.

Meeting Night: Second Tuesday of each month.

A record attendance of 130 members was reported at the monthly general meeting of the W.I.A. last Tuesday. Among the visitors were Messrs. B. J. Grafton, A. F. Cunningham, E. Wood, T. C. Hosking, B. McNamara and Ray Smith (ex-3RY). Mr. E. J. Cawthron (5JE) gave an interesting talk on "Amateur Radio whilst a P.O.W." It was announced that the total membership is now 282.

Ted Cawthron gave probably the most entertaining lecture of all time. Those who knew his form were prepared for some humour but nobody expected such a riot as Ted dished up. There were occasions when he could not continue for some time owing to the audience being convulsed with laughter and unfortunately no attempts of mine would be capable of putting on paper the humourous stories with which Ted secured his laughs. There is no doubt that if Ben Fuller or J. C. Williamson ever hear of Ted the P.M.G.'s Department will lose one of its staff. The gem of the night will bear repeating and is a fair sample of the rest.

The "Nips" apparently had no qualms about printing highly coloured stories of the valour of their airmen and in black and white stated that one "Nip" airman, finding himself out of ammunition and sighting a cargo ship below, simply flew upside down, drew his sword, and flying past the bridge, cut off the captain's head Yes, "fair dinkum!" Need I say more.

Mr. Merv. Brown (5MB), in proposing a vote of thanks summed up the position when he said that some lecturers in America were in the habit of "stacking" the audience to applaud or laugh in the right places, but Mr. Cawthron need never bother to do this as the audience was with him to a man from the start. Speaking seriously, it is realised that although Ted had glossed over his personal actions and the undoubted risks which he ran in attempting to secure news for the morale of the P.O.Ws., undoubtedly his training as an amateur had assisted in no small manner to help him over the bad times whilst a P.O.W.

The W.I.A. representation on the Advisory Council has been increased to four members and nominations have been called from members to secure eight Hams from whom the P.M.G. will choose the required four representatives. This new method of nominating for the Advisory Council has a lot to recommend it and will go a long way toward removing that peculiar objection by some Hams toward the Advisory Council.

W.I.A. interest is high in amateur circles in VK5. The last meeting (14th Jan.) was so crowded that many Hams were forced to seat themselves upon the floor. With the proposed formation of an U.H.F. section with its own meeting night, etc., the W.I.A. should be established in an unshakable position. Leaving myself out, I say without hesitation that a good deal of this is due to the present Council who have put an enormous amount of energy

and hard work in the W.I.A. affairs over the past eighteen months or so.

Should the P.M.G. Department ever abolish the Class "A" and "B" licence, 5PS, 5MD and 5IV will miss the little game of ball tossing which regularly takes place at every meeting. 5PS usually tosses the ball to the chairman (5IV) by asking if any news is available re the abolition of "A" and "B" 5IV tosses the ball to 5MD who thereupon usually tosses it back to 5PS by reading a letter from F.H.Q. A very pretty little game and one that has never failed to get a laugh from the members.

Received news from VK3XU (ex-5XU) and was pleased to know that Gordon is well and still an enthusiastic Ham. All the VK5 boys send regards but why not come down to 14 Mc. OM and we can deliver the regards personally.

This business of being correspondent to the local paper and also the Magazine has its limitations. When anybody discusses the weather or how many eggs their favourite hen is laying they preface the remarks by saying "now this is not for publication" or else "keep that pencil in your pocket." Several Hams have said "goodnight" in a suspiciously frigid manner lately, and I am beginning to find newsgathering an arduous job. Nevertheless Walter Winchel, Don Iddon and Quentin Reynolds are never deterred by anything like this, so who am I to slack up, ahem! Anyway fellows thanks for your help in the past and keep up the good work in the future. If you get a "flash" 5DN will always find me.

G3AVK (Mr. Dave Robertson, ex-VK5RN) has been heard on 14 and 28 Mc. His frequency on 14 Mc. is 14140. Mr. Robertson is at the Birmingham University under Professor M. E. Oliphant in connection with Atomic Physics.

At the last meeting of the Advisory Council the Chairman (Mr. P. Traynor) commented on the present good standard of operating on the various amateur frequencies. Aside from a few unnecessary long CQs and a little superfluous conversation at times, the post-war Ham is definitely regulation conscious.

The news that Prof. Sir Kerr Grant had figured in the New Year Honors List was well received in amateur circles. His personal interest and ready assistance in radio matters has always been appreciated.

It has been suggested to Council that VK5 amateurs may care to send a food parcel to their opposite call sign in England. For example VK5ABC would send a parcel to G5ABC. Members are to be circularised regarding this matter.

The Technical Committee of the W.I.A. reports a busy and successful year. The members are VK5MO (chairman), 5MB, 5DA, 5MF and 5DW. The Committee is available for advice and instruction on any technical matter, and amateurs are cordially invited to seek their advice c/o Hon. Secretary.

TASMANIA

Secretary: J. Brown, VK7BJ,
12 Thirza Street, New Town. 'Phone W 1328.
Meeting place, Photographic Society's Rooms, 162 Liverpool Street, Hobart.

Meeting Night: First Wednesday of each month.

The December meeting of the Council took place at the residence of 7CT, 385 Elizabeth Street, North Hobart, at 8 p.m. on the 20th. Present were 7LJ in the chair, 7BJ, 7CJ, 7CT, 7RF, and 7PA. Apology from 7CW. Correspondence, inward and outward, read and confirmed. Secretary reported the regrettable need of removing several names from the register, owing to their failure to make themselves financial within the prescribed time

In previous times this rule had not been rigidly enforced but in this new era it is intended to carry it out. Time has been extended to give every opportunity, and persons who really do desire to remain members must make some effort to keep financial, even by paying up in instalments if found more convenient. Due notice is given and the Secretary has an abundance of work without devoting time to those who are not interested enough to look after their side of the deal.

Two applications for Associate Membership were received and recommended for confirmation at the next general meeting. The pleasing results of the Field Day were discussed and hopes expressed for even a better one in January, 1947. After much ear-bashing over a goodly supply of supper, dispensed by Mrs. 7CT, the evening—a sultry one too—came to a close with thanks being extended to Mrs. Connor for the attention given.

General meeting, 8 p.m., 8/1/47, one week late owing to the New Year's Day holiday being the first Wednesday. Present were 7CT in chair, 7BJ, 7AH, 7DW, 7YY, 7DH, 7CJ, 7VJ, 7AC, 7RF, 7TR, 7GR, 7OM, and Messrs. Koglin, Tucker, R. Fulton, K. Milne, Lipscombe, and R. Allenby Visitors: L. Edwards, Brown, Watson (2). Apologies from 7LJ, 7CW, 7PA, 7AL, and 7ML. In the absence of President and the two Vice-Presidents, the remaining two Councillors spun the coin in traditional fashion and 7CT, being the winner, was duly installed and thoroughly upheld the traditions set by his predecessors. The holiday spirit must have pervaded the secretarial precincts as no correspondence was reported either way. Two new Associate Members in the persons of R. Fulton and K. Milne were accepted. Advisory Committee members were re-elected for a further 12 months, they are 7LL, 7GJ and 7AC.

The next Field Day was set down for 19/1/47 on same frequency and conditions as previously. Transmitter to be under the control of 7LL.

Bert Russell did the honors for the evening by showing a series of "Talkie" Shorts, much to the enjoyment of all and a hearty vote of thanks to him completed this first meeting for 1947.

7YY reports contact with 7LZ of Launceston, who has suggested a W.I.A. meeting in that City would do much to stimulate interest there, a suggestion worthy of earnest consideration too. 7AB has volunteered to transport a car load from the Coast and several cars are offering from Hobart. Consideration is being given to carrying out this trip in February, but no exact date made as yet until further information can be had from the North. 7YY and 7LZ have arranged a schedule on 3.5 Mc. and suggest a little more use of this band would be worthwhile in keeping the North and South in closer touch, other bands are of little use for this purpose. 7YY's skywire is nothing more than 15 feet of wire stretched along a balcony for 3.5 Mc. and he seems quite proud of its performance too.

7AL, holidaying on East Coast with a portable on 14 and 7 Mc., says VKs 2, 3, 4, 5 and 6 as well as ZLs 1 and 3 have been QSOd, VK7s, as usual, not being heard. The ZLs romp in during the afternoons. He is powered with a Japanese souvenir, a 12 volt genemotor and has about 27 watts input. —...— 7CW still active on 50 Mc. and has been joined by 7GH and 7GR so we are on the way to producing a 50 Mc gang—whose next!

On 11th December, 7CW heard 2NO and 2NT at 7.30 p.m. E.A.S.T. coming through up to S9 at times. Since then he has built a separate 50 Mc. rig and from 17th December to 25th December was putting 100 watts into a three element beam each evening from about 6.30 p.m. onwards with automatic keyer, CQ-VK7CW-6. He says had he been ready when 2NO changed over to hand keying for a call he feels sure they could have QSOd satisfactorily as conditions were good. Since then he has been away on holidays. (Believe he has since contacted VK2—Editor.)

CLEARING THE ETHER

(Continued from Page 4)

R.R. input and output jacks are mounted on left and right sides (rear) of unit respectively. Each consists of two projecting type jacks mounted on polystyrene base, and spaced ¾-in. apart in order to receive standard twin plug, for use with twisted pair feeder.

The final feature is polarised jack for H.T. supply. This circuit must be insulated to D.C. plus modulation voltage, and the polarised jack enables us to do this and at the same time retain flexibility of "plug-in" facility.

Mechanical Aspects of Coil Units for Second Stage.—Input and output units are identical, and Figure 12 conveys sufficient information to enable average reader to grasp idea without further explanation here, except to note that the formers for low frequency are of bakelite tubing; but higher frequency coils are self supporting. Robust design of polystyrene base makes this a push over. In each case link is wound over the centre of tank coil. Where harmonic emissions are noticeable, a faraday shield should be interposed between anode and link coils; however this subject will receive further consideration when dealing with antenna tuning unit.

Operation of Second Stage.—In operation this stage may be used as:—

(a) Final stage for either C.W. or Phone operation.

(b) Driver for higher power or higher frequency unit.

In practice that amount of drive applied to this stage by the first stage is controlled by varying voltage applied to screen grid of first 807 by means of potential divider. Sometimes it is desirable to load the first stage heavily to prevent spurious operation, in this case, swamping resistor connected across link or grid input circuit of second stage will serve the purpose. This artificial load may, when applied to the link circuit, take the form of carbon filament lamp. The carbon filament lamp is recommended because of its negative resistance, that is, if the driver output tends to increase, resistance of lamp will drop placing greater load on driver and thus compensating for rise in output or vice-versa.

Harmonic Operation of Second Stage.—In order to convert to push-push operation for frequency doubling it is only necessary to arrange the output coil unit so that plugs 1 and 5 are bridged to hot end of coil, and that cold end of coil is connected to plug 3. Under these conditions the two anodes are effectively connected together: furthermore, the two sections of tuning capacitor are shunted quadrupling the eeffctive maximum capacity thereof. Naturally the link is situated at the cold end of the coil.

Bugs, Bugs, Bugs.—

(a) Spurious oscillation in screen grid/anode circuit, eliminated by interposing 50 ohm stopper resistor between screen grid of each tube and its associated by-pass condenser.

(b) H.F. Parasitics.—Defeated by employing parasitic suppressor consisting of self supporting 8 turns coil wound over 100 ohm 1 watt carbon resistor installed in wiring at anode clip of each tube.

(c) Second Harmonic Back Wave.—When excitation is removed from stage it tends to oscillate feebly at second harmonic, this condition can be eliminated by applying fixed bias to shift operating condition when unexcited.

50 AND UP

(Continued from Page 11)

2NO were heard. A constant watch was then kept and later VK2 signals increased to a maximum peak of S9. 5GF, using a transceiver on the Port River, heard the VK2s at excellent strength but was unable to make a contact. 5QR succeeded in contacting 2AZ for the first VK2-VK5 50 Mc. QSO. A few minutes later 5KZ also contacted 2AZ The only other QSO that afternoon was between 2AHF and 5QR.

It was immediately apparent that C.C. transmitters were essential, as the modulated oscillators of 5RQ, 5GF, and 5NG could not make the grade with the superhets of the VK2s. Signals heard at good strength included 2NO, 2ML, 2WJ and 3ABA

The band opened again on 6th January. Two more C.C. transmitters were on the air. 5RQ succeeded in working 2WJ, and 5RT was heard at good strength in VK2, but his receiving conditions were against him. 5QR succeeded in working 2AZ, 2WJ, 2LZ and 2LY with a part QSO with 2NO. Reception conditions were poor, as many radiating super-regens cluttered the band

8th January at 8 a.m. was the next burst of activity This time the VK4s came through. After vainly calling 4ZU for some time, 5QR eventually contacted 4HR for the first VK5-VK4 contact. This was shortly followed by a QSO between 4HR and 5GF who now has a 50 watt C.C. transmitter on the band. 4AW and 4CB were heard

The latest Interstate contact occurred on 5th January at 11.15 a.m.!! 2AZ and 5QR were in contact for an hour with S9 signals both ends. That evening at approximately 9.30 p.m., 5QR heard 3IZ and 3DA at S9 calling CQ but all his vocal efforts into the microphone proved fruitless and the VK3s faded a few minutes later.

The active 50 Mc. C.C. transmitters at present are:—5GL (50.91 Mc.), 5KO, 5GF, 5RT (52.2), 5QR (50.0), 5RQ (50.28), 5KZ, 5NG (52.4), 5GB (51.0)

CORRESPONDENCE

Correspondents are requested to keep their letters short and to the point.. The Editor reserves the right to delete anything he may think fit. The views expressed by correspondents are not necessarily those of the proprietors.

Editor "A.R.,"

Since my arrival up here I have had the chance to observe the activities of some amateurs operating from remote spots in this country who apparently imagine their signals are not under observation of the R.Is., particularly on the 28 Mc band

Out-of-band operation, use of resonant filters, poor QRI and general sloppyness of operating are common tricks I have had the misfortune of hearing up here in Katherine.

Apart from the fact that these people are creating a poor impression amongst foreign stations, they represent a real menace to the serious DX chasers who are unfortunate enough to be caught by the blast of their hash.

Having had two QSOs spoilt this morning by a VK3 using a beautiful band-saw resonant filter, I developed sufficient steam to bash this out to you!

Yours faithfully,
N. G ROBERTS, VK5NR.

Low Voltage Soldering Irons

By A. HEYARD, ZL2UQ, From "Break In"

The urge to try out hook-ups is irresistible to anyone who has allowed the smell of burning resin core to enthrall him. The Wogs say the same of the smell of Cairo, but that is only their idea. The writer, being no exception to the average run of hams, has spent off periods in trying out some ideas with a view to incorporation in the old Solon gave up the ghost. Couldn't get another and the ordinary "domestic" iron at hand was too big, too heavy, and too apt to burn and necessitate re-tinning at the wrong moment.

Browsing through a radio periodical, an advertisement for low-voltage irons was found, and the idea was born. Have used a home-made low-voltage iron ever since with marked success. Had a 75-watt core on hand, so decided to make up one or possibly two irons of 30-watt size. Here is the dope, which, it is hoped, may prove useful.

The bit was made of half-inch round copper about 3½-in. long, turned down to ¼-in. for half its length, and bored out to take the element at the wide end—5/16-in. hole 1⅜-in. deep. Quarter-inch end shaped to operator's idea of what the business end of an iron should look like. Two or three 5/16-in. mica discs square across the bottom of the element hole will take care of insulation there. The element is self-supporting. Found the easiest way to make this is to cut a nick in a short piece of copper tube of suitable diameter, pass one end of the nichrome element wire through the tube, over the nick, and wind back down the tube. Mica sheet is used to insulate the element, being wound over a pencil and slipped into the hole before inserting the element.

The element having been wound, wires of a suitable length are hard-soldered to its ends, the centre one then being strung with ceramic beads. The element can then be carefully inserted into the bit.

The barrel is preferably made of thin brass tubing The writer's "best" iron has a barrel constructed from a defunct bicycle pump—nice and light and perfectly cool well below the handle. No more burnt fingers. A "take down" model is not necessary. Have used one of these irons for months with no trouble occurring. In any case, they are cheap, simple, and quickly made. So we hard-solder the barrel to the bit, and before attaching the handle, hard-solder the flex to the wires leading from the element.

The handle is a matter for individual taste and ingenuity. The "best" one referred to has a handle made from an old knife-switch handle—the flange is excellent for upside-down soldering.

With regard to the element. A 6.3 volt 30-watter was thought to be the berries, but this would require nichrome stout enough to carry some 5 amps.—a bit much. So 12 volts was decided upon—allowing the iron to be used in emergency across a 12 volt battery. This required wire to carry 2.5 amp., and 1 k.w. heater wire will do that easily and is easy to get (one burn-out element will make several irons). The resistance of the first couple of irons made was meticulously measured on a megger, but this is not necessary, and measurement on an ordinary ohm-meter has proved to be accurate enough. The first transformer wound was provided with a "keep alive" winding of 10 volts, as it was thought that the bit would probably burn if left too long on full voltage. However, this also is unnecessary. Have had the iron going for eight hours without the need for re-tinning.

At least a dozen of these irons have been made by various chaps, with unvarying results. They range from one not much larger than a lead pencil, with a long thin bit for those hard-to-get-at places, up to a re-hashed 60-watter.

They have another advantage, too. Being low voltage, shocks from casual handling are minor, and if one likes to work all over the bench, leads can be run on stand-offs right along the bench, the iron being clipped on with alligator clips just where required.

DOING IT THE HARD WAY.

We don't advise anyone to put this story to the test—at least, not until stocks increase—but its authenticity is vouched for by Philips Electrical Industries of Sydney.

Some time ago, off the coast of Holland, the S.S. "Meerkerk" ran foul of a mine and sank. About six weeks after the disaster portion of the cargo was washed ashore, and among the cases was one containing Philips-metal-sprayed radio valves.

Eventually, thorough tests showed that although the outside lacquer had suffered from immersion in sea water, the valves still functioned perfectly.

The incident calls to mind the story of another Philips valve washed up at Maroubra after the wreck of the "Belbowrie" in 1938. After merciless battering among the rocks and in the surf, the valve was dried, tested, and came through with an A1 pass.

Although Philips assure us that they're not in the habit of shipwrecking valves to test their strength, they are rather proud of these examples of durability and robust construction.—Philips Electrical Industries of Aust. Pty. Ltd.

AN ABSORPTION WAVEMETER FOR 50 Mc. BAND

A simple satisfactory wavemeter for this band can be made as follows:—

Wind four turns of No. 16 S.W.G. wire 1 inch diameter and self-supporting and space the turns to occupy half an inch. This coil is wired in series with a 2 volt 60 Ma. lamp and a 5 plate midget variable condenser and the whole assembly mounted on the end of a strip of ebonite.

The comparatively large diameter coil enables better tracing of R.F. (such as in heater leads). The wavemeter should tune to 50 Mc. with the condenser about three-quarters meshed.—"Break In," December 1946.

807's AS ZERO BIAS TRIODES.

From "Break In"

Ken McEwen, ZL2WS, has sent us the following letter received from Amalgamated Wireless Valve Co., and has given us permission to reprint it:—

"Further to your letter regarding the use of type 807 valves as zero bias high-mu triodes in class B audio amplifiers, we have carried out some tests on valves operating under these conditions, and are satisfied that this type of operation looks very attractive. At a plate current of 25 Ma., the electrical characteristics are approximately:—

Amplification Factor—220.
Mutual Conductance—5,000 umhos.
Plate Resistance—44,000 ohms.

"Plate current at zero bias in approximately as under:—

Plate Voltage	Plate Current.
200	4 Ma.
300	5 Ma.
400	7 Ma.
500	8 Ma.
600	9.3 Ma.
700	11 Ma.

"We have not yet been able to draw the plate characteristic curves into the region of high plate currents, which can only be done by an oscillographic method, and will therefore take some considerable time, but we propose to build up an amplifier and carry out dynamic tests, including measurements of distortion in order to obtain the optimum load resistance, power output, distortion and grid drive. We then propose to design a driver stage and step-down transformer to give the optimum results for this amplifier. The results will then be described in 'Radiotronics.'

"We are very grateful to you for bringing this matter to our attention and we are taking prompt action to make use of the idea.

AMALGAMATED WIRELESS VALVE CO. PTY. LTD.
F. Langford-Smith, Chartered Engineer (Aust.)."

CRYSTALS FOR PUSH-BUTTON TUNERS.

The greatest problem confronting most manufacturers of quartz crystals has been to find new ways of utilizing their enormously increased production facilities developed during the war. Because improved techniques have lowered costs in quantity production, applications of crystal control are now being considered which were formerly limited to low-production, high-unit-cost apparatus.

One such application is in push-button tuning of broadcast receivers. While crystal tuning of receivers has been used for many years, it was formerly employed solely on special purpose equipment, such as aircraft, marine, and other apparatus in limited production. Now, however, at least two of the larger manufacturers of broadcast receivers (U.S.A.) are planning to go into mass production of sets employing crystal control of the frequencies used for push-button selection. Obviously, this method will have advantages over former systems, provided costs can be held to a reasonable figure. Less servicing will be required and more precise tuning will result.

To keep costs down, it would be well for all manufacturers contemplating using this system to get together and decide on a standard intermediate frequency so that the stock of crystals required to produce the intermediate frequency will be kept to a minimum. Otherwise, the wide variety of crystals needed to cover all frequencies in the broadcast band may create inventory problems for the manufacturer and the radio serviceman. Experience has shown that new developments which are difficult or expensive for the serviceman to handle stand little chance of wide acceptance.—Radio, October 16.

HOOK-UP WIRE.

A thermoplastic insulated radio hook-up wire, tested to underwriters' standards, is now in volume manufacture in U.S.A. by Federal Tel. and Radio Corp., Newark, N.J. The extreme flexibility of Federal's Intelin hook-up wire, its small outside diameter, and permanent colors facilitate quick, accurate assembly and easy servicing.

It is stated that this wire is not affected by oxidation and changes in temperature, will not crack or become brittle, and will remain operative under all conditions of humidity. The tough, abrasion resistant insulation reduces the possibility of accidental damage. Because the thermoplastic insulation is highly resistant to flame, equipment wired with Intelin is free from fire hazard.

The wire is high in dielectric and tensile strength. Short time tests show a dielectric strength of 800 volts per mil with a 0.020 inch wall thickness; thirty days tests at 90°C show a tensile strength of 2100-2250 pounds per square inch.

The free stripping feature is an idea to quick servicing, the conductor is left clean and bright for instant tightly soldered connections. Available in solid or stranded types, the wire ranges in size from 24 to 14 for high or low voltage needs in radio, electronics, appliances and communications and comes in 14 brilliant colors.—Radio, October 16.

"J" ANTENNA.

A properly measured up "J" aerial pulls strongly at its resonant frequency and is fairly sharp—sharp enough to put one "on the band" when used with a 1 or 2 turn ling to the tank.

Dimensions for a 50 Mc. "J" are:—

Radiator—9 feet 3 inches.
Twin Section—4 feet 7¾ inches, spaced 13-16 inches.
V.I.R. Feed Line tapped on at 4½ inches.

From ZL2CX, "Break In," December 1946.

FOR SALE, EXCHANGE, WANTED

9d. per line, minimum 2/-.

WANTED TO PURCHASE.—BACK COPIES OF QST. Year 1942: September. Year 1943: May, June, July, August, September, November, December. Year 1944: January, February, March, April, May, June, September, and October. If prefer, will exchange 1933 November, 1937 October and November, 1938 July, 1939 August, and 1945 February. Please contact and advise prices to W. R. Gronow, 2 Anthony Street, Glen Iris, S.E.6, Phone U 4285.

FOR SALE.—Valves, brand new, EF50, 6AC7, 6AB7, 954, etc. 10 Parker Street, Pascoe Vale, W.8.

OPPORTUNITY SALE.—NEW: 1 only, Trimax Multi-Tap Modulation Xformer, £2; 1 only HY61, Ceramic Base equivalent to 6L6G, £1/5/-; 1 only HY60, Ceramic Base, £1; 3 only HY25, 25 Watt Triodes, £1 each; 2 only 866, £1 each. AS NEW (guaranteed first-class condition): 2 only Triplett 3-in. 0-250 Ma. Moving Coil, £1/10/- each; 1 only Triplett 3-in. 0-100 Ma. Moving Coil, £1/10/-; 1 only Weston 3-in. 0-½ Amp. R.F. Moving Coil, internal Thermo, £2/10/-; 1 only Shure Xtal Mike, 15 ft. Cable, £5; 1 only Trimax Filament Xformer, £1/5/-; 1 only Henderson 250 Ma. 750 volt aside Power Xformer tapped 600 and 500 volts with various Filament Windings, £2/10/-. XTALS: 12 only, AT cut, blanks ¾-in. square, £1 each, all ground just below 7000 Kc. 25 assorted Xtals varying frequencies and cuts, 7/6 to 15/- each. Phone X 3823. G. Benwell, VK3KQ, 480 New St., Elsternwick.